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## ERAS protocol in practice of general surgeon. Our experience.

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**Abstract:** *the concept of Fast track surgery involves long-term reduction of the stress response on the surgery. During a pandemic, the ERAS principles of surgery offer even more relevance, in order to reduce hospital stay and thus reduce the risk of infection. In this study used the method of survey and comparison of data of patients treated at the Department of General Surgery №2 NMU named after O.O. Bogomolets in the period from September 2011 to May 2019, namely - 569 patients who underwent elective surgery using ERAS protocols and minimally invasive surgical interventions. With the using of ERAS protocols was showed that average bed-day was 1.73 days in LHE, 1.43 in LGP, 4.99 in LBI and 4.3 in LOC. Sampling was also performed for different types of surgical interventions: LGP and "open" GP were compared, the average operation time was 117 +/- 35 min and 145 +/- 41 min, respectively, relative to the time spent by the patient in the hospital, the following data were obtained: LGP-2,65 +/- 1, 21 days, and at "open" GP-7,91 +/- 1,52 days. Conclusions: Application of ERAS protocols: reduces pain for the all period of the patient's stay in the hospital, reduces hospital stay, accelerates the return to normal quality of life, reduces the risk of postoperative complications.*

**Key words:** general surgery, analgesia, hernioplasty, cholecystectomy, antiemetics, NSAIDs.

### Introduction

At the edge of the XX -XXI centuries the medical society in Europe have begun to discuss a new concept of perioperative care of surgical patients. Professor Henrik Kehlet (Henrik Kehlet) from Denmark was the developer of this concept. It involves totally breaking management of the traditional perioperative period of patient care - the use of minimal invasive surgery, careful information about upcoming surgical operation, possible complications, behavior in the postoperative period, reduce of pain on all stages of treatment, rejection of starvation in preoperative and early postoperative period, early patient's activation after operations (Polomano et al., 2017), (American Society of Anesthesiologists 2012), (Lidder et al., 2013). Unfortunately it is still not possible

to fully implement these new approaches to daily care in surgical departments in the Ukraine. We tried to explore the possibilities of implementing ERAS protocols in the practice of Ukrainian medical care. What improvements the postulates of these protocols will bring to patients. But in general whether it is expedient to use them in constant surgical activity. (Pędziwiatr et al., 2018)

### Methods

In this study used the method of survey and comparison of data of patients treated at the Department of General Surgery №2 NMU named after O.O. Bogomolets in the period from September 2011 to May 2019, namely - 569 patients who underwent elective surgery using ERAS protocols and minimally invasive surgical interventions. All patients were informed about the use of their data,

Exponent	Control group N=34	Experimental group N=34	P
Pain	6,26 ± 1,52	2,74 ± 1,05	<0,001
Nausea Vomiting (was/wasn't)	22(64,7%) / 12(35,3%)	6(17,6%)/ 28(82,4%)	<0,001
Bloating (was/wasn't)	12(35,3%)/ 22(64,7%)	3(8,8%)/ 31(91,2%)	0,008
Hunger	6,03 ± 1,75	1,97 ± 0,63	<0,001
Thirst	5,94 ± 1,50	2,44 ± 1,16	<0,001
Passage of flatus (was/ wasn't)	3(8,8%)/ 31(91,2%)	25(73,5%)/ 9(26,5%)	<0,001
Stool (was/wasn't)	0/34(100%)	1(2,9%)/ 33(97,1%)	0,321
Weakness	6,47 ± 1,26	2,26 ± 0,86	<0,001
Depression	4,79 ± 1,07	1,50 ± 0,86	<0,001

**Table 1:** “Self-assessment of the patient’s condition on the first postoperative day.”

their treatment data, their survey data and consent was obtained from these patients. Statistical results were obtained on the basis of parametric, namely Student’s T-test and non-parametric methods, namely Wilcoxon’s T-test. The obtained data for better analysis were entered in tables 1 and 2.

### Results

Among the surgical interventions, the distribution was as follows: Traditional laparoscopic cholecystectomy (LHE) -315, Laparoscopic

bariatric intervention (LBI) -107, Laparoscopic hernioplasty (LHP) -116, Laparoscopic surgery on the colon-(LSC). During these operations, emphasis was placed on postoperative nutrition and multimodal analgesia (preventive analgesia before surgery, local infiltration anesthesia of trocar wounds before skin incision, intraoperative analgesia with paracetamol and glucocorticoids, planned postoperative analgesia with non-narcotic drugs). Additionally, antiemetics and antibiotics

**Table 2:** “Questionnaire of patients and their division into groups by type of operation”.

Exponent	Laparoscopic intraoperative n = 99	Laparoscopic gastric bypass n = 97	Laparoscopic resection of the colon n=27
Pain	3,87 ± 1,15	4,40 ± 0,94	2,67 ± 0,83
Nausea Vomiting (was/wasn't)	12 (12,12 %) / 87 (87,88 %)	39(40,21 %)/ 58 (59,79 %)	2 (7,41 %)/ 26 (92,59 %)
Bloating (was/wasn't)	31 (31,31%) / 68 (68,69 %)	13 (13,4 %)/ 84 (86,6 %)	4 (14,81 %)/ 23 (85,19 %)
Hunger	2,67 ± 0,83	5,34 ± 1,07	3,04 ± 0,71
Thirst	2,69 ± 0,87	4,38 ± 0,96	2,07 ± 0,73
Passage of flatus (was/wasn't)	23 (23,23%) / 76 (76,77%)	37(38,14 %)/ 61(61,86 %)	19 (70,37%)/ 8 (29,63 %)
Stool (was/wasn't)	14 (14,14 %) / 85 (85,86 %)	29(29,90 %)/ 68 (70,1 %)	17(62,96%)/ 10 (37,04 %)
Weakness	2,96 ± 0,87	4,49 ± 0,82	2,3 ± 0,72

were prescribed in the postoperative period. All trocar wounds were washed with antiseptic solutions before suturing. Fundamental principles such as reduction of drainage, probes, and urethral catheters were also used during all periods of treatment. Early activation of the patient - in 2-8 hours after operation was obligatory. Elastic or pneumocompression of the lower extremities (in patients with a body mass index greater than 40 kg / m<sup>2</sup>) was used to prevent thromboembolic complications. (Alon D et al., 2019).

At the beginning of our work, we conducted a study in patients who underwent LHE - 34 patients who used ERAS protocols (experimental) and 34 patients with traditional perioperative management (control). They were offered a questionnaire where they assessed the following postoperatively indicators: pain, nausea, bloating, hunger, thirst, flatulence, stool, general weakness, depression. Based on the obtained statistical data, it was found that pain was at least twice less in the experimental group (2.74 +/- 1.05) than in the control group (6.26 +/- 1.52). There was also a decrease in nausea and vomiting, bloating in the experimental group, namely: manifestations of nausea in the experimental group were in 6 patients (17.6%), and in the control group in 22 patients (64.7%), in relation to bloating in the experimental group only 3 patients (8.8%) had bloating, and in the control 12 patients (35.3%). Regarding the assessment of hunger in the experimental group, these feelings were 3 times less than in the control (1.97 +/- 0.63 vs. 6.03 +/- 1.75, respectively) and thirst 2 times (experimental-2.4 +/- 1.16, and control-5.94 +/- 1.5). Also, patients from the experimental group noted early (in 25 patients (75.3%) flatulence, compared with 3 (8.8%) in the control [group.As](#) for the appearance of stool, only one patient had stool in the first 24 hours after surgery(experimental group). The general weakness in patients from the experimental group was estimated at 2.26 +/- 0.86 points, and in the control group this value was equal to 6.47 +/- 1.26 points. group were lower at 1.5 +/- 0.86, and in the control group-4.79 +/- 1.07.

### Discussion

After analyzing the data after the discharge of patients who applied the principles of ERAS, we obtained data that showed that the average bed-day was 1.73 days in LHE, 1.43 in LGP, 4.99 in LBI and 4.3 in LOC.

Sampling was also performed for different types of surgical interventions:

LGP and "open" GP were compared, the average operation time was 117 +/- 35 min and 145 +/- 41 min, respectively, relative to the time spent by the patient in the hospital, the following data were obtained: LGP-2,65 +/- 1, 21 days, and at "open" GP-7,91 +/- 1,52 days.

Analyzing the data obtained by comparing groups of patients divided by type of operation, namely Laparoscopic intraperitoneal hernioplasty (99 cases), Laparoscopic gastric bypass (97 cases), Laparoscopic resection of the colon (27 cases), we obtained the following results: pain was greatest after gastric bypass surgery, least after laparoscopic resection of the colon, nausea or vomiting were most common after laparoscopic gastric bypass surgery, bloating was most pronounced after laparoscopic intraperitoneal hernioplasty, feeling of hunger and thirst after patients of the stomach, the presence of stool in the first postoperative days was observed in patients after laparoscopic resection of the intestine, the general weakness is most pronounced after laparoscopic gastric bypass.

### Conclusions

Application of ERAS protocols:

1. Reduces pain for the all period of the patient's stay in the hospital.
2. Reduces patients stay in the hospital
3. Accelerates the return to normal quality of life
4. Reduces the risk of postoperative complications.

All this was possible due to the reduction of the patient's stress response during the pre-, intra-, and early postoperative periods.

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### Consent to publication

All authors have read and approved the final version of the manuscript. All authors have agreed to publish this manuscript.

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A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of article

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## ERAS протоколи в практиці хірурга. Наш досвід.

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**Анотація:** Концепція швидкої хірургії передбачає тривале зниження стресової реакції під час оперативних втручань. Під час пандемії принципи хірургії ERAS є ще більш актуальними, щоб зменшити перебування в лікарні і таким чином зменшити ризик зараження. У даному дослідженні використано методику опитування та порівняння даних пацієнтів, які лікуються на кафедрі загальної хірургії №2 НМУ імені О.О. Богомольця у період з вересня 2011 року по травень 2019 року, а саме – 569 пацієнтів, яким було проведено планову операцію за протоколами ERAS та малоінвазивні оперативні втручання. За допомогою протоколів ERAS було показано, що середній ліжковий день становив 1,73 дня у LHE, 1,43 у LGP, 4,99 у LBI та 4,3 дня у LOC. Також проводили відбір проб для різних видів хірургічних втручань: порівнювали ЛПП та «відкрити» ГП, середній час операції становив 117 +/- 35 хв та 145 +/- 41 хв відповідно до часу перебування пацієнта у лікарні отримано такі дані: ЛПП-2,65 +/- 1, 21 день, а при «відкритому» ГП-7,91 +/- 1,52 доби. Висновки: Застосування протоколів ERAS: зменшує біль на весь період перебування пацієнта в стаціонарі, скорочує перебування в стаціонарі, прискорює повернення до нормальної якості життя, знижує ризик післяопераційних ускладнень.

**Ключові слова:** загальна хірургія, анальгезія, герніопластика, холецистектомія, антиеметики, НПЗП.



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